

TENTATIVE

TOSHIBA GATE TURN-OFF THYRISTOR

# SG1500GXH25

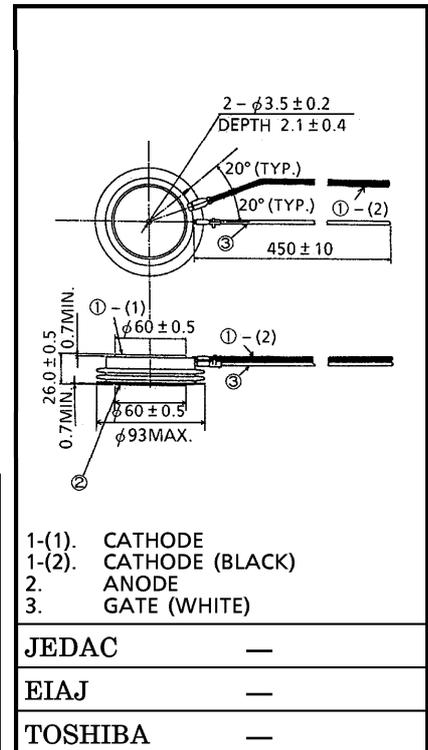
INVERTER APPLICATION

Unit in mm

- Repetitive Peak Off-State Voltage :  $V_{DRM} = 4500\text{ V}$   
(Note 1)
- Repetitive Peak Reverse Voltage :  $V_{RRM} = 4000\text{ V}$
- R.M.S On-State Current :  $I_T(\text{RMS}) = 750\text{ A}$
- Peak Turn-Off Current :  $I_{TGQM} = 1500\text{ A}$
- Critical Rate of Rise of On-State Current :  $di/dt = 250\text{ A}/\mu\text{s}$
- Critical Rate of Rise of Off-State Voltage :  $dv/dt = 900\text{ V}/\mu\text{s}$

MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage (Note 1)	$V_{DRM}$	4500	V
Repetitive Peak Reverse Voltage	$V_{RRM}$	4000	V
Peak Turn-Off Current (Note 2)	$I_{TGQM}$	1500	A
R.M.S On-State Current (Note 3)	$I_T(\text{RMS})$	750	A
Peak One Cycle Surge On-State Current (Non Repetitive, 10 ms- Width Half Sine Waveform)	$I_{TSM}$	8000 (50 Hz)	A
		9000 (60 Hz)	
Critical Rate of Rise of On-State Current (Note 4)	$di/dt$	250	A / $\mu\text{s}$
Peak Forward Gate Current	$I_{FGM}$	70	A
Average Gate Power Dissipation	$P_G(\text{AV})$	150	W
R.M.S Gate Current (Note 5)	$I_G(\text{RMS})$	42	A
Peak Reverse Gate Voltage (At Static)	$V_{RGM}$	15	V
Operation Junction Temperature Range	$T_j$	-40~115	°C
Storage Temperature Range	$T_{stg}$	-40~115	°C
Mounting Force	—	$19.6 \pm 2.0$	kN



Weight : 800 g

(Note 1) :  $V_{GK} = -2\text{ V}$

(Note 2) :  $V_D = 2400\text{ V}$ ,  $V_{DM} \leq 3000\text{ V}$ ,  $C_S \geq 3\ \mu\text{F}$ ,  $di_{GQ}/dt \geq 35\text{ A}/\mu\text{s}$ ,  $V_{DSP} \leq 750\text{ V}$ ,  
 $L_S \leq 0.2\ \mu\text{H}$  (TOSHIBA METHOD)

(Note 3) : 50 Hz Half Sine Waveform

(Note 4) :  $V_D \leq 2250\text{ V}$ ,  $I_{TM} \leq 1500\text{ A}$ ,  $I_G \geq 20\text{ A}$  ( $t_r \leq 1\ \mu\text{s}$ ),  $f \leq 50\text{ Hz}$ ,  $C_S \leq 3\ \mu\text{F}$ ,  
 $R_S \geq 10\ \Omega$ ,  $25^\circ\text{C} \leq T_j \leq 115^\circ\text{C}$

(Note 5) : Ambient Temperature of coaxial gate-cathode lead = 90°C

961001EAA2

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

## ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Repetitive Peak Off-State Current	$I_{DRM}$	$V_{DRM} = 4500 \text{ V}$ , $V_{GK} = -2 \text{ V}$ $T_j = 115^\circ\text{C}$	—	—	80	mA	
Repetitive Peak Reverse Current	$I_{RRM}$	$V_{RRM} = 4000 \text{ V}$ $T_j = 115^\circ\text{C}$	—	—	80	mA	
Repetitive Peak Reverse Gate Current	$I_{RGM}$	$V_{RGM} = 15 \text{ V}$ $T_j = 115^\circ\text{C}$	—	—	10	mA	
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 1500 \text{ A}$ , $T_j = 115^\circ\text{C}$	—	—	4.7	V	
Gate Trigger Voltage	$V_{GT}$	$V_D = 24 \text{ V}$ $R_L = 0.1 \Omega$	$T_j = -40^\circ\text{C}$	—	—	1.7	V
			$T_j = 25^\circ\text{C}$	—	—	1.2	V
Gate Trigger Current	$I_{GT}$	$R_L = 0.1 \Omega$	$T_j = -40^\circ\text{C}$	—	—	5.5	A
			$T_j = 25^\circ\text{C}$	—	—	1.5	A
Turn-On Delay Time	$t_d$	$V_D = 2250 \text{ V}$ , $I_{TM} = 1500 \text{ A}$ $di_F/dt = 250 \text{ A}/\mu\text{s}$	—	—	3.0	$\mu\text{s}$	
Turn-On Time	$t_{gt}$	$I_{GM} = 15 \text{ A}$ ( $t_r = 1 \mu\text{s}$ ) $T_j = 25^\circ\text{C}$ , non-snubber	—	—	12	$\mu\text{s}$	
Critical Rate of Rise of Off-State Voltage	$dv/dt$	$V_{DRM} = 3000 \text{ V}$ $T_j = 115^\circ\text{C}$ , $V_{GK} = -2 \text{ V}$ Exponential Rise	900	—	—	$\text{V}/\mu\text{s}$	
Storage Time	$t_s$	$I_{TGQ} = 1500 \text{ A}$	—	—	17	$\mu\text{s}$	
Gate Turn-Off Time	$t_{gq}$	$V_{DM} = 3000 \text{ V}$ , $T_j = 115^\circ\text{C}$	—	—	19	$\mu\text{s}$	
Tail Time	$t_{tail}$	$V_D = 2250 \text{ V}$ , $C_S = 3 \mu\text{F}$ $di_{GQ}/dt = 35 \text{ A}/\mu\text{s}$	—	—	200	$\mu\text{s}$	
Gate Turn-Off Current	$I_{GQ}$	Off squeeze current $\geq 300 \text{ mA}$	—	—	500	A	
Reverse Recovery Charge	$Q_{rr}$	$I_T = 1500 \text{ A}$ , $V_R = 1500 \text{ V}$ $C_S = 3 \mu\text{F}$ , $R_S = 10 \Omega$	—	—	4000	$\mu\text{C}$	
Reverse Recovery Time	$t_{rr}$	$di_T/dt = -200 \text{ A}/\mu\text{s}$ $T_j = 115^\circ\text{C}$	—	—	10	$\mu\text{s}$	
Thermal Resistance	$R_{th(j-f)}$	Junction to fin	—	—	0.018	$^\circ\text{C}/\text{W}$	

